What is claimed is:

1. A method for separating a polymer from a solvent, comprising:

introducing a superheated polymer-solvent mixture to an extruder, wherein the extruder comprises an upstream vent and a downstream vent;

removing solvent from the superheated polymer-solvent mixture via the upstream vent and the downstream vent; and

isolating a polymer product from the superheated polymer-solvent mixture;

wherein the polymer-solvent mixture comprises a polymer and a solvent, wherein the amount of polymer in the polymer-solvent mixture is less than or equal to about 75 weight percent based on the total weight of polymer and solvent, and wherein the polymer is a poly(arylene ether).

2. The method of claim 1, wherein the polymer-solvent mixture further comprises a polyetherimide, a polycarbonate, an additional poly(arylene ether), a polyamide, a polyarylate, a polyester, a polysulfone, a polyetherketone, a polyimide, a olefin polymer, a polysiloxane, a poly(alkenyl aromatic), or a combination comprising at least one of the foregoing polymers.

3. The method of claim 1, wherein the upstream vent is operated at about 750 mm of Hg or greater or at about 750 mm of Hg or less, and wherein the downstream vent is operated at about 750 mm of Hg or less.

4. The method of claim 1, wherein about 50 to about 99 percent of the solvent present in the superheated heated polymer-solvent mixture is removed through the upstream vent.

5. The method of claim 4, wherein about 1 to about 50 percent of the solvent present in the superheated polymer-solvent mixture is removed through the downstream vent.

6. The method of claim 1, wherein the superheated polymer-solvent mixture is pressurized.

7. The method of claim 6, wherein the superheated polymer-solvent mixture has a temperature about 2°C to about 200°C higher than the boiling point of the solvent at atmospheric pressure.

8. The method of claim 1, wherein the extruder further comprises a side feeder, wherein the side feeder comprises a side feeder vent operated at about 750 mm of Hg or greater or at about 750 mm of Hg or less.

9. The method of claim 8, wherein the superheated polymer-solvent mixture is introduced into the side feeder via a pressure control valve connected to the side feeder.

10. The method of claim 8, wherein the side feeder further comprises a kneading block, wherein the pressure control valve is positioned between the extruder and the kneading block and the kneading block is positioned between the pressure control valve and the side feeder vent.

11. The method of claim 8, wherein the side feeder is a twin-screw side feeder having a length to diameter ratio of 20 or less.

12. The method of claim 8, wherein the side feeder is a twin-screw side feeder having a length to diameter ratio of 12 or less.

13. The method of claim 1, wherein the extruder further comprises a non-venting side feeder.

14. The method of claim 13, further comprising introducing a filler, additive, or additional polymer to the extruder via the non-venting side feeder.

15. The method of claim 1, wherein the heated superheated polymer-solvent mixture is introduced to the extruder via a feed inlet in direct communication with the extruder barrel.

16. The method of claim 15, wherein the feed inlet is a pressure control valve.

17. The method of claim 16, wherein a cracking pressure of the pressure control valve is about 0.07 kgf/cm^2 to about 25 kgf/cm^2.

18. The method of claim 15, wherein the upstream vent is positioned upstream from the feed inlet.

19. The method of claim 1, wherein the polymer product is substantially free of solvent.

20. The method of claim 1, wherein the extruder is a twin-screw counter-rotating extruder, a twin-screw co-rotating extruder, a single-screw extruder, or a single-screw reciprocating extruder.

21. The method of claim 1, wherein the extruder is operated at a temperature of about 200 to about 400 degrees centigrade.

22. The method of claim 1, wherein the extruder operation is characterized by a ratio of a feed rate in kilograms per hour to an extruder screw speed in revolutions per minute, the ratio being about 0.045 to about 45.

23. The method of claim 1, further comprising introducing the polymer product into a second extruder.

24. The method of claim 23, wherein the second extruder is a twin-screw counter-rotating extruder, a twin-screw co-rotating extruder, a single-screw extruder, or a single-screw reciprocating extruder.

25. The method of claim 23, wherein the second extruder comprises a second extruder vent operated at about 750 mm of Hg or less.

26. The method of claim 1, wherein the superheated polymer-solvent mixture is heated by a heat exchanger or an extruder.

27. The method of claim 1, wherein the polymer-solvent mixture has a polymer content of about 5 to about 40 percent by weight based on the total weight of polymer and solvent.

28. The method of claim 1, wherein the solvent is a halogenated aromatic solvent, a halogenated aliphatic solvent, a non-halogenated aromatic solvent, a non-halogenated aliphatic solvent, or a mixture thereof.

29. The method of claim 1, further comprising introducing nitrogen gas into the extruder.

30. The method of claim 1, further comprising filtering the polymer-solvent mixture in a solution filtration system prior to introducing the polymer-solvent mixture to the extruder.

31. The method of claim 30, wherein the solution filtration system comprises a filter having a pore size of less than about 50 micrometers.

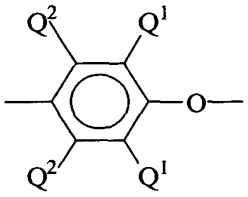
32. The method of claim 30, wherein the solution filtration system comprises a sintered-metal filter, a cloth filter, a fiber filter, a paper filter, a pulp filter, a metal mesh filter, a ceramic filter, or a combination comprising at least one of the foregoing filters.

33. The method of claim 1, wherein the extruder comprises a melt filtration system.

34. The method of claim 33, wherein the melt filtration system comprises a sintered metal filter, a metal mesh filter, or a combination thereof.

35. The method of claim 1, wherein the polymer-solvent mixture comprises a product feed stream from a reaction vessel.

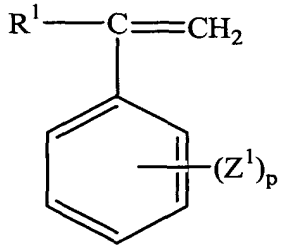
36. The method of claim 1, wherein the poly(arylene ether) comprises a plurality of structural units of the structure



wherein for each structural unit, each Q^1 is independently halogen, primary or secondary C_1-C_7 alkyl, phenyl, haloalkyl, aminoalkyl, hydrocarbonoxy, halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms; and each Q^2 is independently hydrogen, halogen, primary or secondary lower alkyl, phenyl, haloalkyl, hydrocarbonoxy, or halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms.

37. The method of claim 1, wherein the poly(arylene ether) has an intrinsic viscosity of about 0.1 to about 0.6 deciliters per gram as measured in chloroform at 25°C.

38. The method of claim 1, wherein the polymer product further comprises a poly(alkenyl aromatic) resin which contains at least 25% by weight of structural units derived from an alkenyl aromatic monomer of the formula



wherein R^1 is hydrogen, C_1-C_8 alkyl, or halogen; Z^1 is vinyl, halogen or C_1-C_8 alkyl; and p is 0 to 5.

39. The method of claim 38, wherein the poly(alkenyl aromatic) resin is polystyrene.

40. The method of claim 38, wherein the polymer product comprises about 1 to about 99 weight percent poly(arylene ether) and about 99 to about 1 weight percent poly(alkenyl aromatic) based on the total weight of the poly(arylene ether) and poly(alkenyl aromatic) resin.

41. The method of claim 38, wherein the polymer product comprises about 40 to about 60 weight percent poly(arylene ether) and about 60 to about 40 weight percent poly(alkenyl aromatic) based on the total weight of the poly(arylene ether) and poly(alkenyl aromatic) resin.

42. The method of claim 1, wherein solvent present in the superheated polymer-solvent mixture is removed through the upstream vent and the downstream vent to provide a polymer product containing less than about 3000 parts per million solvent.

43. A method for separating a polymer from a solvent, comprising:

introducing a superheated polymer-solvent mixture via a pressure control valve located on an extruder or on a side feeder attached to the extruder, wherein the extruder comprises an upstream vent and a downstream vent, wherein the side feeder comprises a side feeder vent, and wherein the pressure control valve is attached to the extruder or positioned between the extruder and the side feeder vent;

removing solvent from the superheated polymer-solvent mixture via the upstream vent, the downstream vent, and the side feeder vent; and

isolating a polymer product from the polymer solvent mixture;

wherein the polymer-solvent mixture comprises a polymer and a solvent, and wherein the polymer comprises a poly(arylene ether).

44. The method of claim 43, wherein the side feeder vent and the upstream vent are operated at about 750 mm of Hg or greater or at about 750 mm of Hg or less, and wherein the downstream vent is operated at about 750 mm of Hg or less.

45. The method of claim 43, wherein the side feeder comprising the pressure control valve further comprises a kneading block, wherein the pressure control valve is positioned between the extruder and the kneading block and the kneading block is positioned between the pressure control valve and the side feeder vent.

46. The method of claim 43, further comprising filtering the polymer-solvent mixture prior to introducing the polymer-solvent mixture to the extruder.

47. The method of claim 43, wherein the polymer product further comprises a poly(alkenyl aromatic) resin.